DCATT Project

Proof Test Plan for the DCATT AC Flat Collar Assembly in the CIA Room of Building 7

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Objective:

The objective of this plan is to detail the proof testing that needs to be done to certify the spreader plate, lifting slings, hoist ring assembly, and a mirror collar assembly that will be used for lifting in the CIA room of Building 7 for the DCATT project.

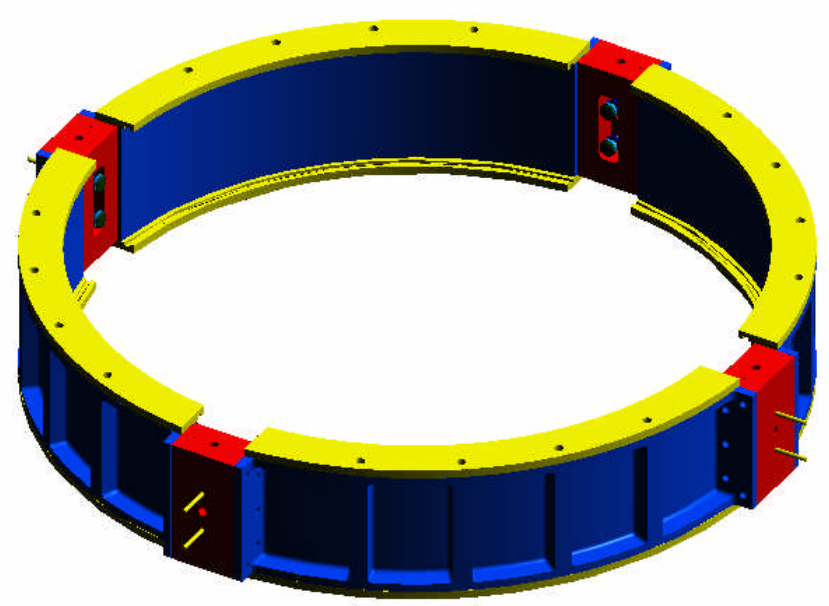
Description of Hardware:

Overall DCATT Assembly

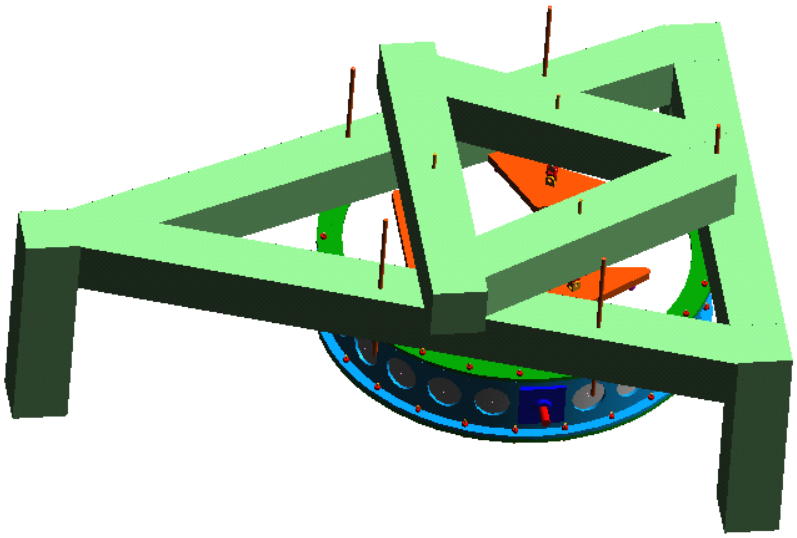
The DCATT project is a ground-based non-flight research project in support of NGST. The DCATT assembly will be located in the CIA room of Building 7. It consists of a 5' x12' optical bench mounted on a steel frame. Above the frame, located on three pads is the Telescope Handling Fixture that holds the telescope and secondary mirror metering structure. Sitting on top of the Telescope Handling Fixture is the AC Flat Handling Fixture that contains the AC Flat. The entire assembly is about 15 feet tall and 8 feet wide and 14 feet long and weighs about 5000 pounds.

Autocollimating Flat
The Autocollimating Flat is an 850-pound Zerodur glass mirror with a diameter of 40.07 inches and a 7.4 inch thickness. As part of the buildup of the DCATT structure, the mirror will be installed into the Collar Assembly, rotated 180 degrees, and then installed into the AC Flat Handling Fixture. This fixture will be lifted about 15 feet and placed on top of the Telescope Handling Fixture.

Collar Assembly
The Collar Assembly consists of four ring sections (shown in blue) that are fitted around the mirror and attached to an aluminum block (shown in red). Top and bottom flanges (shown in yellow) are bolted to the ring sections that clamp the mirror in place. The ring sections have twenty _-13 tapped holes on the top surface where hoist rings can be installed for lifting. At four locations located 90 degrees apart on the side of the ring there are _-13 holes which are suitable installing hoist rings which allow 180 degree rotation of the mirror and collar assembly. The collar assembly weighs 123 pounds and is made of 6061-T6 aluminum. All flanges are 0.5 inches thick.



AC Flat Handling Fixture
The AC Flat Handling Fixture is a frame made of 6” square aluminum tubing. It is designed to hold the AC Flat mirror in position over the DCATT telescope. The picture below shows the general concept of the fixture, although the final drawings have not yet been completed. The long sides of the triangle are about 80” and the length of the legs is about 24”. The AC Flat mirror will be bolted to the fixture using _-13 studs that will go through the frame. The weight of the fixture is about 200 pounds. The maximum weight of the AC Flat Handling Fixture with the AC Flat mirror and collar assembly installed is 1228 pounds.



Spreader Plate
The spreader plate is a 1” thick by 48” diameter 6061-T651 aluminum plate. In the center is a 1-8 tapped hole where the main lifting hoist ring will be attached. Twelve _-13 tapped holes are installed every 30 degrees around the perimeter at 21” radius from the center for various configurations of hoist rings.

Mass Simulator
A 915-pound aluminum disk has been fabricated which simulates the mass and geometry of the AC Flat. The simulator has multiple _-13 tapped holes spaced evenly around the perimeter on the top and bottom surfaces. The simulator fits into the collar assembly. It is available to use on the proof lifts.

Lifting Details

Several lifts will be performed in the CIA room in building 7. In all configurations, a spreader plate will be used. The lifts are as follows:

Description	Mass	Lift Method
AC Flat & Collar Ass'y	1017 pounds	4 point lift using 2 matched slings
AC Flat Handling Fixture	1228 pounds	3 point lift using 3 matched slings
Telescope Handling Fixture & Primary Telescope	900 pounds	3 point lift using 3 matched slings
AC Flat & Collar Ass'y 180 degree rotation	980 pounds	2 point lift using 2 matched slings

Note: Mass does not include weight of spreader plate, hoist rings, and slings.

The lift will be accomplished using multiple _-13 hoist rings rated at 2500 pounds each. A single 1-8 hoist ring rated at 10,000 pounds will be used on the spreader plate. The 12' long nylon lifting slings are rated at 6,200 pounds for a point to point pickup. The 1" thick, 48" diameter 6061-T6 aluminum spreader plate will be used above the lift to position the slings close to vertical during the lift. The slings and hoist rings will be certified separately prior to the proof lift.

Proof Lift Details

Three proof lifts will encompass the loads described above. They will be performed as shown in the following chart:

Description	Proof Lift Mass	Additional Required Mass	Lift Method
AC Flat mass simulator & Collar Ass'y	1050 x 2 = 2100 pounds	1062 pounds (2100 – 915 – 123)	4 points using 2 slings & spreader plate
Simulation of pickup of AC Flat Handling Fixture using mass simulator	=1400 x 2 = 2800 pounds	1885 pounds (2800 – 915)	3 points using 3 slings & spreader plate
AC Flat mass simulator & Collar Ass'y	1000 x 2 = 2000 pounds	962 pounds (2000 – 915 – 123)	2 points using 2 slings & spreader plate

The additional mass can be bolted, clamped, or hung off of the mass simulator as appropriate.